straight waveguide section ~~20~~ 14 connects the feed port 10 to the port 16 when in a second position, and is also therefore dissimilar in shape to the bent waveguide section 20. That is, the two waveguide sections 14 and 20 must be dissimilar in shape for connecting the feed port 10 to respective output ports 16 and 22. Additionally, while the preferred form has only two sections 14 and 20, additional sections could be added, so that there is at least a plurality of the dissimilar waveguide with respective sections and output ports.

On page 14 line 7 change "signals 24 and 18" to "respective signals 18 and 24".

The port 10 is designated generally as an input port, and, the ports 22 and 16 are designated generally as output ports, but, ports 16 and 22 may transceive respective signals 18 and 24 ~~and 18~~ to and from the port 10 as the feed signal 12. The signal 12 is generally designated as an input signal having a plurality of component signals, such as signals 24 and 18, having differing orthogonal polarization states, such as linear or circular polarization states, left hand circular or right hand circular polarization states, and linear horizontal or linear vertical polarization states. The signal separation and isolation by desired polarization states are realized by polarization sensitive probes 19 and 25 and waveguide switch selection at the respective straight and bent switch positions.

On page 15 line 13 change "12" to "18".

To change positions from a bent waveguide position to and from a straight waveguide position, the selectable waveguide has a rotating selector knob 28 or other mechanical means for rotating a rotating element 30 supporting the bent waveguide section 20 and straight waveguide section 14 on a stationary housing 32. The selectable waveguide preferably uses the rotating element 30 in the stationary housing 32 to change positions for respectively communicating signals 18 or 24. As preferably designated, the selectable waveguide uses the bent waveguide 20 to communicate linearly polarized signals 24 and uses the straight waveguide 14 to preferably communicate circularly polarized signals 18. The bent waveguide section 20 and the straight waveguide section 14 can have either a square or circular cross section and sized for the frequencies of interest. The manually actuated rotating knob 28 is rotated to connect either the bent waveguide 20 or the straight waveguide 14 between the antenna feed port 10 and either of the linear port 22 or the circular port 16, respectively. Hence, the bent waveguide section 20 preferably communicates a linearly polarized signal 24 as feed signal 12 between the linearly polarized port 22 and the antenna feed port 10, and, the straight waveguide section 14 preferably communicates circular polarized signals ~~12~~ 18 as feed signal 12 between the circularly polarized port 16 and the antenna feed port ~~12~~ 10. Hence, the rotating knob 28 only has two positions, the first position connecting the linear port 22 to the antenna feed port

10 for linearly polarized signal communication as shown in Figure 2, and the second position connecting the circular port 16 to the antenna feed port 10 for circularly polarized signal communication as shown in Figure 1.

On page 15 line 23, insert "respectively" before "separate".
On page 15 line 27, change "22" to "16".

The polarization sensitive probes 19 and 25 are preferably used to respectively separate by polarization states the two orthogonal polarized signals 18 and 24. The linear port 22 may communicate two independent signals separated by orthogonal polarization states, such as, linear horizontal and linear vertical polarization states. Likewise, the circular port ~~22~~ 16 may communicate two independent signals separated by orthogonal polarization states, such as, left hand and right hand circular polarization signals. Each of the probes 19 or 25 are preferably responsive to a predetermined polarization state and as such are used to isolate and separate two independent orthogonally polarized component signals.

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On page 16 line 11 delete "waveguide".
On page 16 line 11 insert "of the waveguide" after "20".
On page 16 line 12 change "remains" to "remain".
On page 16 line 18 change "ports 22 and 16" to "respective ports 16 and 22".

By rotating the rotating element for waveguide section alignment, the probes 19 and 25 are thereby rotated into a position for receiving or transmitting one of the plurality of differing polarized signals, thereby perfecting a polarization state selection. The ~~waveguide~~ cross sections 14 and 20 of the waveguide remain[[s]] unaltered from the antenna feed port 10 to either of the linear port 22 and the circular port 16. The cross section areas of the waveguide sections 14 and 20 remain fixed within the selectable waveguide. Because the waveguide cross section remains unchanged, no mechanism exists for polarization modifications from antenna feed port 10 through the waveguide sections 14 and 20 to the respective ports 16 and 22 ~~and 16~~. Consequently, the waveguide does not degrade polarization isolation. The waveguide cross sections 14 and 20 may be square and in this case the signals are propagated on TE01 and TE10 waveguide modes. The waveguide cross section can also be circular and the signals 18 and 24 are propagated on orthogonal TE11 waveguide modes. Hence, the waveguide cross section of the sections 14 and 20 is preferably preserved throughout the rotating member 30.

On page 17 line 5 change "19 or 25" to "25 or 19".
On page 17 line 19 change "24" to "18".
On page 17 line 24 change "24" to "25".
On page 17 line 24 change "18" to "24".

The waveguide section selection, and hence polarization state selection, by rotating the knob 28, may be by conventional mechanical means to route the feed signals 12 to one of port 22 and 16 to thereby place a respective polarization sensitive probe 25 or 19 ~~or 25~~ in the path of feed signal 12. Like conventional waveguide baseball switches, the rotation can be manually performed or accomplished by using a motor drive that can be remotely controlled. However, the waveguide section selection knob 28 has the improved features of offering polarization state selection using dissimilar waveguide sections 14 and 20 and using respective dissimilar polarization state sensitive probes 19 and 25. The rotating knob 28 is used to both select one waveguide section 14 or 20, and to simultaneously select the one of the two respective probes 19 and 25 to perfect polarization state selection. The first switch selection position selects the straight waveguide section 14 and probe 19 to connect the antenna feed port 10 to the circular port 16, and to select the polarization sensitive probe 19 communicating signal ~~24~~ 18 of one polarization state as shown in Figure 1. The second switch selection position is obtained by rotating the knob one hundred and eighty degrees to select the bent waveguide section 20 of the selectable waveguide to connect the antenna feed port 10 to the linear

port 22, and to select the probe ~~24~~ 25 communicating signal ~~18~~ 24 having a differing polarization state as shown in Figure 2. Hence, the knob 28 is in effect a polarization state selection knob 28 to select one of a plurality of orthogonally polarized signals without coupling energy between the signals that would otherwise degrade the signal separation.

On page 18 line 18 change "22" to "20".

The losses in dual polarized signal communication through the selectable waveguide result from the losses within the waveguide sections 14 and ~~22~~ 20 which losses are very small. The losses in the waveguide sections 14 and 20 are less than the insertion losses associated with conventional hybrid networks. Thus, signal reception and transmission for the present invention are more efficient. The waveguide sections 14 and 20 are preferably used to select one of the two orthogonally polarized signals by virtue of the polarization sensitivity of the probes 19 and 25, but can also be used to select signals 18 and 24 of differing frequencies.

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On page 19 line 20 delete "18".

On page 19 line 21 insert "18" after "signals".

Referring to Figures 3a, a modified selectable waveguide 39 may be used for both polarization state and frequency selection of the feed signal 12 communicated to the antenna feed 13. The input port 10 receives from the antenna 13 the polarized signal 12 and communicates the signal 12 through either of the waveguide sections 14 and 20 depending on which of the sections 14 or 20 is in alignment with the input port 10. The modified selectable waveguide section 40 can be used in applications where multiple frequency operation is required. The waveguide 39 is initially sized to communicate signals within desired frequency bands. The modified selectable waveguide 39 includes a modified bent waveguide section 40 having an extended straight portion 42 and a frequency selective reflective surface 44. The extended portion 42 is aligned to the port 16 when the bent waveguide section 40 is aligned to port 22 when the modified selectable waveguide 39 is switched to the bent position. The frequency selective reflective surface 44 is used to reflect signals 24 of one frequency, such as low frequency signals, to the port 22, and to pass signals ~~18~~ of another frequency, such as high frequency signals <u>18</u>, to the port 16. The probes 19 and 25 can then be used to select signals of differing polarization states, and by virtue of the frequency sensitive reflective surface 44, concurrently select signals of differing frequencies.

On page 20 insert "The feed 13 communicates signal 12 through port 10 and straight waveguide section 14, but not through reflective surface 44 of the bent waveguide section 40 not being selected." before "As such".

Referring to Figure 3b, the modified selectable waveguide 39 is attached to a coupler 46 having a left hand port 48 communicating left hand port signal 47 to a left hand probe 49, and, having a right hand port 50 communicating right hand port signals 51 to a right hand probe 53. The feed 13 communicates signal 12 through port 10 and straight waveguide section 14, but not through reflective surface 44 of the bent waveguide section 40 not being selected. As such, the probes 53 and 49 are used to isolate orthogonally polarized signals, such as right hand circular and left hand circular polarized signals. It should be apparent that the coupler 46 functions as a splitter providing two outputs, and that the coupler 46 and probes 49 and 53 could, as well, be attached to port 22 for respectively communicating horizontal linear and vertical linear orthogonally polarized signals 24. The coupler 46 has a taper port 52 for attenuating low frequency component signals and passing high frequency component signals 54 to the probe 19. The input port 10 receives from the antenna 13 the polarized signal 12 and communicates the signal 12 through either of the waveguide sections 14 and 40 depending on which of the sections 14 or 40 is in alignment with the input port 10. The waveguide section 40 has an extended straight portion 42 and a frequency selective reflective surface 44 that is a

forty five degree reflective surface used to reflect signals 24 of one frequency, such as low frequency signals, to the port 22 and to pass signals 18 of another frequency, such as high frequency signals, to port 16. The probes 19 and 25 can then be used to select signals of differing polarization states and by virtue of the frequency sensitive reflective surface 44, concurrently select signals of differing frequencies. Hence, the modified selectable waveguide 39 can be modified to include means that provide frequency selection while the probes 25 and 19 can be used to select desired polarization states to isolate signals of interest. It should now be equally apparent, that the selectable waveguide of Figures 1 and 2, and or the modified selectable waveguide 39 of Figures 3a and 3b, can be used in combination with various probes, couplers and tapers to isolate signal of desired polarization states and frequencies. Further still, the selectable waveguide of Figures 1 and 2, and or the modified selectable waveguide 39 of Figures 3a and 3b, can be cascaded and used in combination with various probes, couplers and tapers to isolate many different signals of respective desired polarization states and frequencies.

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On page 22 line 22, change "25ab" to "25a and 25b".

In the straight position, the waveguide dimension is chosen to permit propagation of all system frequencies. The straight position is preferably used for communicating circularly polarized signals at the lower frequencies. All of the signals propagate unmodified through the straight waveguide sections 14a and 14b. At the output circular port 16a of the modified selectable waveguide 39a, the coupler 46a is used to separate the lowest frequency signals into ports 48a and 50a. The port 48a can be used for left hand polarized signals, and the port 50a can be used for selecting right hand polarized signals in the lowest frequency band. The coupler 46a is transparent to the higher frequencies. The design of such couplers is well known and commonly used. The waveguide taper 52a follows the coupler 46a so that the waveguide size is reduced permitting propagation of signals of all frequencies except the lowest frequency signals. The second modified selectable waveguide 39b has smaller dimensions and follows the taper port 52a. The selectable waveguide 39a is transparent to frequency bands above the lowest frequencies. The coupling of the lower frequency band to ports 22a and 22b is enabled in the bent positions. The miter bends have frequency selection surfaces 44a and 44b in place of a conducting surface 26 used by the single frequency selectable waveguide switch design. These frequency selective miter surfaces 44a and 44b reflect the lowest frequency signals 24a and 24b into the linearly polarized ports 22a and 22b for connection to respective probes

25a[[b]] and 25b. The frequency selective miter surfaces 44a and 44b are transparent to higher frequencies so that the higher frequency signals 54a can be communicated through the cascaded arrangement at the higher frequencies.

On page 23 line 8 change "53ab" to "53a and 53b".
On page 23 line 20 change "36a" to "46a".

Each of the modified selectable waveguides 39a and 39b, respectively includes ports 16a and 16b, 22a and 22b, 48a and 48b, and 50a and 50b, tapers 52a and 52b, straight waveguide sections 14a and 14b, and bent waveguide sections 40a and 40b. Waveguide 39a has the feed port 10a receiving the feed signal 12 and provides the output signal 54a that is fed into the feed port 10b of waveguide 39b to provide the output signal 54b to probe 19. Probes 25a and 25b respectively communicating signals 24a and 24b, probes 49a and 49b respectively communicating signals 47a and 47b, probes 53a[[b]] and 53b respectively communicating signals 51a and 51b, and probe 19 communicating signal 54b, all of which can be used for selecting signals of differing frequencies and polarization states. The input port 10a receives from the antenna 13 the polarized signal 12 and communicates the signal 12 through either of the waveguide sections 14a and 40a depending on which of the sections 14a or 40a of waveguide 39a is in alignment with the input port 10a. The bent section 40a includes a forty

five degree reflective surface 44a that is used to reflect signals 24a of one frequency, such as low frequency signals, to the port 22a and to pass signals 54a of another frequency, such as high frequency signals, through the port 16a, through coupler ~~36a~~ 46a and through to port 52a as communication signals 54a. The input port 10b of waveguide 39b receives signals 54a from the waveguide 39a and communicates the signal 54a through either of the waveguide sections 14b and 40b depending on which of the sections 14b or 40b of waveguide 39b is in alignment with the input port 10b. The bent section 40b includes a forty five degree reflective surface 44b that is used to reflect signals 24b of one frequency, such as low frequency signals, to the port 22b and to pass signals 54b of another frequency, such as high frequency signals, through port 16b, through coupler 46b and through port 52b to the probe 19.

On page 24 line 11 change "miter bend" to "the miter bend".
On page 24 line 17 change "50b" to "50a".
On page 24 line 22 change "52" to "52b".

The cascaded arrangement places the low frequency band modified selectable waveguide 39a closest to the antenna feed port 10a and the antenna feed 13, whereas the high frequency band modified selectable waveguide 39b may be used to communicate signals in a high frequency band. In the polarized selectable waveguide 39a closest to the antenna feed 13, a modification can be made to the miter bend. In single frequency designs, the miter bend 44a consists of a conducting

surface 26. In the multiple frequency design, the conducting miter surface 26 is replaced by a frequency selective surface 44a capable of reflecting the lowest frequency components and passing the higher frequency components. The coupler 46a passes only low frequency signals to ports 48a and ~~50b~~ 50a. The coupler 46b passes only high frequency signals to the ports 48b and 50b. Another frequency selective surface 44b can be used to prevent mode conversion and signal loss for the higher frequency components. The frequency selective surfaces 44a and 44b and taper ports 52a and 52b can be used for low, high, higher frequency band isolation.

On page 24 line 27 change "50b" to "51b".
On page 25 line 1 change "25a" to "24a".
On page 25 line 1 insert "through section 42a" before "high".
On page 25 line 4 change "25b" to "24b".
On page 25 line 7 change "25a" to "24a".
On page 25 line 7 insert "through section 42a" before "high".
On page 25 line 7 change "25b" to "24b".
On page 25 line 8 insert "through section 42b" before "higher".
On page 25 line 8 change "50b" to "51b".
On page 25 line 19 insert "54b" after "signals".

In the straight-straight position, the arrangement passes low frequency signals 47a and 51a, passes through section 42a high frequency signals 54a, 47b and ~~50b~~ 51b, and passes higher frequency signals 54b. In the bent-straight position, the arrangement passes low frequency signals ~~25a~~ 24a, passes high

frequency signals 54a, 47b and 50b, and passes higher frequency signals 54b. In the straight-bent position, the arrangement passes low frequency signals 47a and 51a, passes through section 42a high frequency signals 54a, ~~25b~~ 24b, 47b and 51b, and passes higher frequency signals 54b. In the bent-bent position, the arrangement passes low frequency signals ~~25a~~ 24a, passes high frequency signals 54a and 25b, and passes through section 42b higher frequency signals 47b, ~~50b~~ 51b, and 54b. Preferably, the port 22a communicates low frequency linearly polarized signals 24a to probe 25a, port 48a communicates low frequency left hand circularly polarized signals 47a to probe 49a, port 50a communicates low frequency right hand circularly polarized signals 51a to probe 53a, port 52a communicates high frequency signals to port 10b, port 22b communicates high frequency linearly polarized signals 24b to probe 25b, port 48b communicates high frequency left hand circularly polarized signals 47b to probe 49b, port 50b communicates high frequency right hand circularly polarized signals 51b to probe 53b, and port 52b communicates higher frequency signals 54b to probe 19.

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